

## REMARKS

The present remarks are responsive to the Office Action mailed on September 21, 2006. Claims 1, 7 and 8 have been amended. Claims 4 and 11 have been canceled in the present communication to better clarify the invention while claim 9 has been canceled by a previous amendment. Support for the amendments can be found, inter alia, in Applicants' specification and original claims. Also accompanying this communication is a petition to extend the prosecution on this matter for three months and the appropriate fee.

In view of the amendments and the following remarks, Applicants respectfully submit that pending claims **1-3, 5-8, 10, and 12-14** are in condition for allowance and Applicants respectfully request allowance of such claims.

### Discussion of the Office Action

In the Office Action of September 21, 2006, the Examiner rejected claims 1-7 and 14 under 35 U.S.C. §103(a) as being unpatentable over Demizu et al. (U.S. Patent No. 5,547,794), he rejected claims 1, 3, 8, and 19 under 35 U.S.C. §103(a) as being unpatentable over Tavlarides et al. (U.S. Patent No. 5,817,239) and he rejected claims 1, 4-7 and 11-14 under 35 U.S.C. §103(a) as being unpatentable over Tavlarides et al. (U.S. Patent No. 5,817,239) in view of Moskovitz (U.S. Patent No. 5,948,726).

### Discussion of the rejection of claims **1-7** under 35 U.S.C. §103(a)

As set forth above, claims **1-7** stand rejected under 35 U.S.C. §103(a) as being unpatentable over Demizu et al. (U.S. Patent No. 5,547,794). The Examiner states with

respect to claims 1 and 7 that Demizu et al disclose "a granulated composition comprising hydrophobic aerogel (see column 9, lines 28-31) and active carbon (column 4, lines 37-41)." Applicants respectfully traverse the rejection.

Under MPEP §2142, there are three requirements to establish a *prima facie* case of obviousness.

- 1) There must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings.
- 2) There must be a reasonable expectation of success.
- 3) The prior art reference (or references when combined) must teach or suggest all the claim limitations.

Applicants' amended independent claims 1 and 7 are as follows:

Claim 1:

A composition comprising:

a mixture consisting essentially of (1) a dried hydrophobic sol-gel functionalized with at least one arsenic-removing constituent **comprising a manganese and iron mixture** and (2) a solid support structure.

Claim 7:

A composition comprising:

a predetermined amount of a hydrophobic aerogel functionalized with at least one arsenic-removing constituent **comprising a manganese and iron mixture**; and

a predetermined amount of granulated activated carbon, wherein said composition is capable of removing arsenic contaminants from aqueous media.

Regarding base claims 1 and 7, Applicants first respectfully submit that the rejection fails under prong 3 of the obviousness test because Demizu et al. (U.S. Patent No. 5,547,794) **does not** teach or suggest anywhere the highlighted limitations of Applicants' amended claims 1 and 7, as shown above. Specifically, Demizu et al **does not teach or disclose** "a hydrophobic sol-gel (aerogel) **functionalized** with at least one arsenic-removing constituent **comprising a manganese and iron mixture** ." Demizu et al instead teaches a toner for electrostatic imaging that incorporates coloring agents and binder resins added to an emulsion (see for example, abstract and specification). Conversely, with respect to functionalizing, Applicants teach (see for example, paragraph [00014], last two sentences of page 5 bridging page 6), "The arsenic adsorption site is formed by the incorporation of an arsenic specific binding material into or onto the aerogel and/or the aerogel/GAC composite. **Manganese (III) 2,4 pentanedionate and ferric chloride** are used to demonstrate the viability of the approach." Applicants submit that such functionalizing is a structural configuration of the aerogel and in combination with the solid support structure of claim 1 or the granulated carbon solid support structure, as shown in claim 7, operates to significantly clean arsenic (see Fig. 1) out of an aqueous stream.

It is to be noted that the Examiner had stated in the Office Action dated 9/21/06, that "Demizu fails to disclose functionalizing with an arsenic removing constituent," but that "it would have been obvious to one of ordinary skill in the art

because Demizu discloses incorporation of Phosphoric acid.” Applicants submit that the present application is a continuation-in-part of the parent application and is subject to a terminal disclaimer based on the parent application (i.e., now U.S., Patent No. US6806227 B2). In the parent, Phosphoric acid is utilized to functionalize the materials so as to remove metals, such as, Uranium. However, in the present continuation-in part application, there is no expressed teaching of using Phosphoric acid because, as known and understood by those of ordinary skill in the art, Phosphoric acid does not have the correct valence structure, i.e., the preferred oxidation states, to hold onto arsenic, which is why the present application does not teach or suggest using Phosphoric acid for functionalizing so as to be an arsenic removing constituent. Nonetheless, Demizu does not teach functionalizing his materials in any manner expressly or impliedly so as to remove any metal and thus the rejection of claims 1 and 7 under the third prong of the obviousness test is submitted as being improper.

Second, Applicants respectfully submit that the rejection fails under prong 1 of the obviousness test because there is no suggestion or motivation in the reference itself to modify the toner of Demizu so as to remove metals. Under MPEP §2143.01, “[o]bviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art.” *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In addition, also under MPEP §2143.01, the Federal Circuit has stated that, “The mere

fact that the references can be combined or modified does not render the resultant combination obvious unless the prior art suggests the desirability of the combination.” In re Mills 916 F. 2d 680, 16 USPQ2d 1430 (Fed Cir. 1990). Applicants reiterate that Demizu et al teaches a toner for imaging. Thus, Applicants submit that it rationally follows that such a nonanalogous art would not motivate one skilled in the art to seek such a reference and perhaps modify such a reference because Demizu is not reasonably pertinent to the specific problem of removing arsenic (see *In re Deminski*, 796 F. 2d 436). Accordingly, Applicants respectfully submit that the rejections of claims 1 and 7 under 35 U.S.C. §103(a) also fail under the first prong of the obvious test.

Third, Applicants respectfully submit that the rejection also fails under prong 2 of the obviousness test because Demizu et al. (U.S. Patent No. 5,547,794) has no reasonable expectation of success of removing arsenic from a solution or otherwise because such an application as taught by Demizu is not geared for the removal of arsenic.

Accordingly, because the rejection based on Demizu et al. (U.S. Patent No. 5,547,794) fails all three prongs of the obviousness requirements mandated under MPEP §2142, Applicants submit that the rejection of claim 1 and claim 7, under 35 U.S.C. §103(a), is improper and is requested to be removed.

Regarding dependent claim 4, such claim has been canceled by the present communication and thus the rejection of claim 4 under 35 U.S.C. §103(a) is deemed moot.

Regarding dependent claims 2-3, and 5-6, and claim 14, such claims directly or indirectly depend from independent claim 1, which is deemed unobvious in light of the comments shown above.

Under MPEP §2143.01, "If an independent claim is nonobvious under 35 U.S.C. §103, then any claim depending therefrom is nonobvious." *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Accordingly, Applicants respectfully submit that the rejection of dependent claims 2-3, and 5-6, and claim 14 under 35 U.S.C. §103(a), is also deemed improper as mandated under MPEP §2143.01 and the rejection is requested to be removed.

Discussion of the rejection of claims 1-3, 8, and 10 under 35 U.S.C. §103(a)

As set forth above, claims 1-3, 8, and 10 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Tavlarides et al. (U.S. Patent No. 5,817,239). Applicants respectfully traverse the rejection.

Under MPEP §2143.03:

"To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art."  
*In re Royka*, 490 F. 2d 981, 180 USPQ 580 (CCPA 1974). Applicants respectfully traverse such a rejection.

Applicants' amended independent claims 1 and 8 are as follows:

Claim 1:

A composition comprising:

a mixture consisting essentially of (1) a dried hydrophobic sol-gel functionalized with at least one arsenic-removing constituent **comprising a manganese and iron mixture** and (2) a solid support structure.

Claim 8:

A method comprising:

providing a dried hydrophobic sol-gel on a solid support structure, wherein said dried hydrophobic sol-gel and said solid support structure are functionalized with at least one arsenic-removing constituent **comprising a manganese and iron mixture**;

contacting said dried hydrophobic sol-gel on a solid support structure to an aqueous sample; and

analyzing said dried hydrophobic sol-gel on said solid support structure after contacting it with said aqueous sample in order to detect the presence and/or concentration of arsenic.

Applicants respectfully submit that Tavlarides et al. (U.S. Patent No. 5,817,239) **does not** teach or suggest anywhere the highlighted limitations of Applicants' amended claims 1 and 8, as shown above to warrant an obvious rejection. Specifically, Tavlarides et al. **does not teach or disclose "a dried hydrophobic sol-gel... functionalized with at least one arsenic-removing constituent comprising a manganese and iron mixture."** Technically, manganese is the ligand in Applicants' invention but it is the unobvious mixture of manganese and iron that enables a functionalized sol-gel so as to be an arsenic removing constituent. Tavlarides et al.

conversely, teaches a hydroxyquinone ligand (see for example, column 4, lines 35-39) as the material that would be used to remove heavy metal ions. Applicants respectfully submit that there are many ligands that could be used to remove arsenic and the cited patent is specific to one particular ligand, but Tavlarides et al. does not disclose nor suggest a functionalized sol-gel comprising a manganese and iron mixture.

Moreover, an argument that one skilled in the art would be motivated to modify Tavlarides so as to arrive at Applicants invention would be based on impermissible hindsight reasoning (see MPEP §2142). If the Examiner reasons that it would still be obvious to one skilled in the art to modify Tavlarides to arrive at Applicants' claimed limitations, then Applicants calls upon the Examiner to supply the cited section that teaches or suggests Applicants' embodiments.

Furthermore, it is to be noted that in 2005 a poster paper, entitled "Aerogel-GAC Composites for Arsenic and Uranium Removal", was submitted (Three of the co-inventors are highlighted below) that encompassed the embodiments of the present application and received an American Water Works Association (Awwa) Annual Conference Poster Symposium First Place Award. (see Westerhoff, P., Badruzzaman, M., Navarhoaragon, J., **Coleman, S., Coronado, P., Reynolds, J.**, Gammon, S., Genetti, V. AWWA Annual Conference, San Francisco, CA, June 12-17 (2005)). Applicants thus also respectfully submit that if the claimed subject matter of the present invention were considered "obvious," then those who are of extra-ordinary skill in the water treatment industry art would not have presented such a prestigious award to those listed inventors for their accomplishments. Stated another way, if it were an obvious



modification, those of extra-ordinary skill in the in the industry would have modified the Tavlarides invention (patented 1998) well before the American Water Works Association awards presentation of 2005 so as to themselves receive the award.

Accordingly, Applicants respectfully submit that because Tavlarides et al. (U.S. Patent No. 5,817,239) **does not** teach or suggest all of the claim limitations as mandated under MPEP §2143.03, the rejections of claims **1** and **8** under 35 U.S.C. §103(a) are deemed improper and are requested to be removed.

Regarding dependent claims **2-3** and **10**, claims 2-3 directly depend from independent claim 1 and dependent claim 10 depends from base claim 8, wherein the base claims are deemed unobvious in light of the amendments and comments shown above.

Under MPEP §2143.01, "If an independent claim is nonobvious under 35 U.S.C. §103, then any claim depending therefrom is nonobvious." In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Accordingly, Applicants respectfully also submit that the rejection of dependent claims **2-3** and **10** under 35 U.S.C. §103(a), is also deemed improper and the rejection is requested to be removed as mandated under MPEP §2143.01.

Discussion of the rejection of claims **1, 4-7** and **11-14** under 35 U.S.C. §103(a)

As set forth above, claims **1, 4-7** and **11-14** stand rejected under 35 U.S.C. §103(a) as being unpatentable over Tavlarides et al. (U.S. Patent No. 5,817,239) as applied above, and further in view of Moskovitz et al. (U.S. 5,948, 726). Applicants respectfully traverse the rejection.

Again, under MPEP §2143.03:

“To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art.”

*In re Royka*, 490 F. 2d 981, 180 USPQ 580 (CCPA 1974). Applicant respectfully traverses such a rejection.

Applicants have amended independent claims 1 and 7 as shown and as discussed above. Applicants, similar to the arguments above for the rejection of claims 1 and 8 under 35 U.S.C. §103(a) with respect to Tavlarides, respectfully submit that Tavlarides et al. (U.S. Patent No. 5,817,239) also **does not** disclose or suggest the limitations found in base claims 1 and 7 to warrant an obvious rejection. Moreover, Applicants submit that Moskovitz (U.S. Patent No. 5,948,726) also does not disclose or suggest, alone or in combination with Tavlarides, Applicants' claimed limitations. Moskovitz, instead teaches an absorbent having a metal oxide, a colloidal metalloid oxide, an oxide adsorbent, or an acid (see Summary of the Invention [0052-0061]. Such oxides and or an acid of the cited reference are not discussed nor claimed (i.e., in base claims 1 and 7) in the present application.

Accordingly, Applicants respectfully submit that base claims 1 and 7 should not warrant an obvious rejection under 35 U.S.C. §103(a) based on the cited references and thus, the rejection of claims 1 and 7 under 35 U.S.C. §103(a) is respectfully requested to be removed.

Regarding dependent claim 4 and 11, such claims has been canceled by the present communication and thus the rejection of such claims under 35 U.S.C. §103(a) is deemed moot.

Regarding dependent claims 5-6 and 12-14, such claims directly or indirectly depend from either independent claim 1 or independent claim 8, both of which are deemed unobvious in light of the amendments and comments discussed above.

Under MPEP §2143.01, "If an independent claim is nonobvious under 35 U.S.C. §103, then any claim depending therefrom is nonobvious." In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Accordingly, Applicants respectfully submit that the rejection of dependent claims 5-6 and 12-14 under 35 U.S.C. §103(a), is also deemed improper and the rejection is requested to be removed as mandated under MPEP §2143.01.

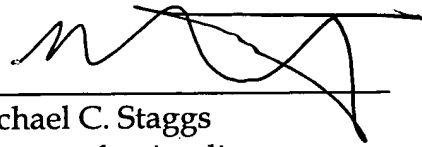
### CONCLUSION

The undersigned respectfully submits that the rejections of the claims raised in the Office Action dated September 21, 2006 have been fully addressed and overcome, and the present application is believed to be in condition for allowance.

It is respectfully requested that this application be reconsidered and that pending claims **1-3, 5-8, 10, and 12-14** in this case be passed to issue. In the event that the Examiner finds any remaining impediment to the prompt allowance of these claims that can be clarified with a telephone conference, he is respectfully requested to initiate the same with the undersigned at (925) 422-3682.

Respectfully submitted,

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